



IN THE MATTER OF  
KOREAN PATENT APPLICATION  
UNDER SERIAL NO. 10-2002-0077407

I, THE UNDERSIGNED, HEREBY DECLARE :  
THAT I AM CONVERSANT WITH BOTH THE KOREAN AND THE ENGLISH  
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THE PARTICULARS OF WHICH ARE SET FORTH BELOW :

KOREAN PATENT APPLICATION UNDER

SERIAL NO.: 10-2002-0077407

FILED ON: December 6, 2002

IN THE NAME OF: LG ELECTRONICS INC.

FOR: LCD PROTECTING DEVICE OF  
MOBILE TERMINAL

IN WITNESS WHEREOF, I SET MY HAND HERETO

THIS 31<sup>st</sup> DAY OF January, 2007

BY

A handwritten signature in cursive script, appearing to read "Lee".

LEE, Shin Sook

[Translation]

PATENT APPLICATION

To : Director General  
The Patent Office

Date of Application : 2002. 12. 06

Classification for international patent : H04B 1/38

Title of the Invention : LCD PROTECTING DEVICE OF MOBILE TERMINAL

Applicant : LG ELECTRONICS INC.  
Code No. : 1-2002-012840-3

Attorney : Names : YANG, Soon Suk  
Code No. : 9-1998-000348-9  
General Authorization registration No.: 2002-027111-1

Inventor : Name : LEE, Choong Jae  
Resident Reg. No.: 710922-1845925  
Address: A-202, Samyoung Heights Villa, 146-119, Sam-Dong, Uiwang-Si, Gyeonggi-Do, Korea  
Nationality : Republic of Korea

Request for Examination: Filed

This application is hereby filed pursuant to Article 42 of the Patent Law.

/S/ Attorney : YANG, Soon Suk

[Fee]		29,000 WON
Basic filing fee -	18 Pages	0 WON
Additional filing fee -	0 Pages	0 WON
Fee for claiming a priority -	0 Case	301,000 WON
Fee for filing request for examination -	6 Claims	330,000 WON
Total -		

[Attached document ]

1. Abstract, Specification (Drawing) -1 copy



[Translation]

## ABSTRACT OF THE DISCLOSURE

[Abstract]

A liquid crystal display (LCD) protecting device of a mobile terminal and, more particularly, to an LCD protecting device of a mobile terminal that includes a rigid member for supplementing rigidity of an external case in order to protect the LCD against the external impact that applies a force that presses the LCD by more than an elastic limit of an external case. The LCD protecting device of a mobile terminal including a sub-LCD having a display unit provided on one surface thereof, a printed circuit board (PCB) having the sub-LCD installed on one surface thereof, and an upper cover for covering the PCB and the sub-LCD such that a protrusion is formed at the cover portion of the sub-LCD to be higher than a peripheral portion thereof and includes an opening and a rib connected with the opening, wherein a rigid member for reinforcing strength is integrally fused on the protrusion.

[Representative drawing]

FIG. 7

[Index words]

Protrusion, opening, rigid member, LCD, upper cover, lower cover

## [SPECIFICATION]

[Title of the Invention]

### LCD PROTECTING DEVICE OF MOBILE TERMINAL

[Brief description of the Drawings]

FIG. 1 is a perspective view showing an opened state of a dual-folder type mobile terminal according to the related art;

FIG. 2 is a perspective view showing a closed state of the dual-folder type mobile terminal according to the related art;

FIG. 3 is a sectional view showing an installation state of a sub-LCD of the dual-folder type mobile terminal according to the related art;

FIG. 4 is a sectional view showing a state that the sub-LCD of the dual-folder type mobile terminal is damaged by an external force according to the related art;

FIG. 5 is a perspective view showing an opened state of a dual-folder type mobile terminal according to the present invention;

FIG. 6 is a perspective view showing a closed state of the dual-folder type mobile terminal according to the present invention;

FIG. 7 is a partial sectional view of the dual-folder type mobile terminal according to the present invention;

FIG. 8 is a perspective view of a rigid member according to the present invention; and

FIG. 9 is a sectional view showing a dual-folder type mobile terminal according to a modification of the present invention.

\*\*\*\* Explanation for the major reference numerals \*\*\*\*

100 : main body	200 : folder
202 : main LCD	203 : sub-LCD
203-1 : display unit	204 : upper cover
204-1 : opening	204-2 : rib
205 : lower cover	206 : case
400 : printed circuit board	500 : transparent window
600 : sponge	700 : rigid member

[Detailed description of the invention]

[Object of the invention]

[Field of the invention and background art]

The present invention relates to an LCD protecting device of a mobile terminal and, more particularly, to an LCD protecting device of a mobile terminal that includes a rigid member for supplementing rigidity of an external case in order to protect the LCD against the external impact that applies a force that presses the LCD by more than an elastic limit of an external case.

In general, as shown in FIGs. 1 and 2, the folder type mobile terminal includes a main body 10, a folder 20, and a hinge device 11 that opens and closes the folder 20 from the main body 10. Accordingly, the folder 20 is rotatably moved centering around a rotational axis (A) of the main body 10 so as to be opened or closed.

Side arms 12 combined with the folder 20 are formed at an upper end of the main body 10 and face each other symmetrically, and a keypad 13, a data

input unit, is positioned at a lower side of the side arms 12.

The key pad includes number keys, a power key, a function key, etc., and data is inputted as desired according to an input operation of the keys. A microphone 14 is installed at the lowermost end of the main body 10.

The folder 20 includes a case including an upper cover 24 and a lower cover 25, an ear piece 27 including a speaker and installed at an inner side of an upper end of the lower cover 25, and a main LCD 22, a data output unit, at an outer side of the upper cover 24. Information displayed on the main LCD 22 is transferred to a user (in FIG. 1), and information displayed on the sub-LCD 23 is transferred to the user when the folder 20 is closed (in FIG. 2). Accordingly, the main LCD 22 and the sub-LCD 23 are installed within the folder 20 so as to be seen through an opening formed at the upper cover 24 and the lower cover 25.

The installation state of the sub-LCD 23 will now be described. As shown in FIG. 3, the sub-LCD is installed to be stacked on a printed circuit board (PCB) 30 installed in the case so that a display unit 23-1 can be seen from outside through an opening 24-1 formed on the cover 24.

A transparent window 40 is attached on an outer surface of the outer side of a rib 24-2 connected at an inner side of the opening 24-1.

Accordingly, the user can visually watch information displayed on the display unit of the sub-LCD 23 through the transparent window 40 and the opening 24-1. The transparent window 40 serves to prevent debris from being introduced into the folder 20 through the opening 24-1.

In order not to make the folder 20 thick overall, only a portion 'B' for covering the sub-LCD 23 is protruded with a certain height compared with the entire surface of the upper cover 24.

In order to prevent the sub-LCD 23 from being damaged by an external impact 'F1' applied from the front side of the protrusion 'B', a certain space is formed between the inner surface and a front surface of the sub-LCD 23, and a buffer member 40 is provided between the sub-LCD 23 and the rib 24-2 facing the front side of the sub-LCD 23.

Accordingly, although an external impact greater than an elastic limit of the upper cover 24 is applied to the front side of the protrusion 'B', because the buffer member 40 supports the rib 24-2 and simultaneously absorbs the external impact, the sub-LCD 23 is prevented from being damaged by the external impact.

However, as shown in FIG. 4, when the external impact 'F1' stronger than the elastic limit of the upper cover 24 is applied to the side, namely, a slope portion, of the protrusion 'B', the portion is easily deformed to the inner side of the case 26 of the upper folder 20, hitting the side and an outer portion of the front surface of the sub-LCD 23, and thus, the sub-LCD 23 is damaged.

[Problem to be solved by the invention]

Therefore, an object of the present invention is to provide an impact absorbing material between an LCD, excluding a display unit, and a protrusion.

Accordingly, the present invention is to restrain the protrusion from being deformed due to an external force to its maximum level and absorb an external impact force applied to the protrusion to thus prevent damage of the sub-LCD due to the external impact force.

To achieve these and other advantages and in accordance with the purpose of the present invention, as embodied and broadly described herein,

there is provided an LCD protecting device of a mobile terminal including a sub-LCD having a display unit provided on one surface thereof, a printed circuit board (PCB) having the sub-LCD installed on one surface thereof, and an upper cover for covering the PCB and the sub-LCD such that a protrusion is formed at the cover portion of the sub-LCD to be higher than a peripheral portion thereof and includes an opening and a rib connected with the opening, wherein a rigid member for reinforcing strength is integrally fused on the protrusion.

[Construction of the invention]

The construction and embodiments of the present invention will now be described with reference to FIGs. 5 to 9.

FIG. 5 is a perspective view showing an opened state of a dual-folder type mobile terminal according to the present invention, FIG. 6 is a perspective view showing a closed state of the dual-folder type mobile terminal according to the present invention, FIG. 7 is a partial sectional view of the dual-folder type mobile terminal according to the present invention, FIG. 8 is a perspective view of a rigid member according to the present invention, and FIG. 9 is a sectional view showing a dual-folder type mobile terminal according to a modification of the present invention.

As shown in FIGs. 4 and 5, the folder type mobile terminal includes a main body 100, a folder 200, and a hinge device 300 for opening and closing the folder 200 with respect to the main body 100.

Accordingly, the folder 200 is rotated centering around the rotational shaft (C) with respect to the main body 100 so as to be opened and closed.

The side arms 301 of the main body 100 combined with the folder 200 are



formed to face with each other symmetrically, and a keypad 102, a data input unit, is positioned at a lower side of the side arms 301. The keypad includes number keys, a power key, function keys, and inputs data as desired according to an inputting operation of the keys. A microphone 101 is installed at the lower end of the main body 100.

The folder 200 includes a case 206 including an upper cover 204 and a lower cover 205, an ear piece 201 installed at an inner side of an upper end of the lower cover 205 and having a speaker, and a main LCD 202, a data output unit, installed at a lower side of the ear piece 201. In addition, a sub-LCD 203, a data output unit, is installed at an outer side of the upper cover 204.

Information displayed on the main LCD 202 is transferred to the user when the folder 200 is opened (in FIG. 5), and information displayed on the sub-LCD 203 is transferred to the user when the folder 200 is closed (in FIG. 6).

In this case, the main LCD 202 and the sub-LCD 203 can be seen through openings formed on the upper and lower covers 204 and 205.

The installation state of the sub-LCD 203 and the upper cover 204 will now be described. As shown in FIG. 7, the sub-LCD 203 is installed to be stacked on the PCD 400 installed within the case so that a display unit 203-1 can be seen from outside through an opening 204-1 formed on the upper cover 204.

A transparent window 500 is attached on an outer surface of the outer side of a rib 204-2 connected at an inner side of the opening 204-1.

An impact absorbing sponge 600 is provided between the rib 204-2 and the LCD 203.

Accordingly, the user can visually watch information displayed on the display unit 203-1 of the sub-LCD 203 through the transparent window 500 and

the opening 204-1. The transparent window 500 serves to prevent debris from being introduced into the folder 200 through the opening 204-1.

In addition, the sponge 600 supports the rib 204-2 against an external impact applied to the front side of the protrusion 'D' and absorbs the impact to thereby prevent the LCD 203 from being damaged by the external impact.

In order not to make the folder 200 thick overall, only the portion 'D' for covering the sub-LCD 203 is protruded with a certain height compared with the entire surface of the upper cover 204. A certain interval is formed between the inner surface and the sub-LCD 203.

A rigid member 700 for reinforcing strength is integrally fused on the protrusion 'D'.

Preferably, the rigid member 700 is integrally attached on an inner surface of the protrusion 'D'.

The rigid member 700 is integrally fused when injection-molding the upper cover 204.

Namely, before injecting a casting to a metal mold (not shown) of the upper cover 204, the rigid member 700 is inserted and the casting of the upper cover 204 is injected to the metal mold to thus integrally fused to the upper cover 204.

In addition, as the rigid member 700 fused on the protrusion 'D' of the upper cover 204, an iron core is used and has a shape that may exert a maximum reinforcing effect structurally. Preferably, the rigid member 700 has a grid shape as shown in FIG. 8.

With such a structure, when the external impact 'F2' stronger than an elastic member of the upper cover 204 is applied to the side of the protrusion 'D',

damage of the side of the protrusion 'D' according to the external impact 'F2' and elastic deformation of the protrusion 'D' in the direction of 'F2' can be prevented.

Accordingly, the sub-LCD 203 can be prevented from being damaged by the external impact 'F2' applied to the side of the protrusion 'D'.

In a modification of the present invention, as shown in FIG. 9, the rigid member 700 can be integrally attached on the entire portion of the case 206 in order to reinforce overall rigidity of the case 206. The embodiment of the modification is the same as shown in FIGs. 7 and 8.

#### [Effect of the invention]

As so far described, in the present invention, because the rigid member is integrally attached on the upper cover, the protrusion and the entire portion of the case, rigidity of the terminal case can be improved compared with the related art terminal case, and thus, the case and the LCD can be prevented from being damaged by the external impact applied to the terminal, so the life span can be lengthened.

What is claimed is:

1. A liquid crystal display (LCD) protecting device of a mobile terminal including a sub-LCD having a display unit provided on one surface thereof, a printed circuit board (PCB) having the sub-LCD installed on one surface thereof, and an upper cover for covering the PCB and the sub-LCD such that a protrusion is formed at the cover portion of the sub-LCD to be higher than a peripheral portion thereof and includes an opening and a rib connected with the opening, wherein a rigid member for reinforcing strength is integrally fused on the protrusion.

2. The device of claim 1, wherein the rigid member is integrally attached on an inner surface of the protrusion.

3. The device of claim 1, wherein the rigid member is integrally used when the upper cover is injection-molded.

4. The device of claim 1, wherein the rigid member is made of an iron core material.

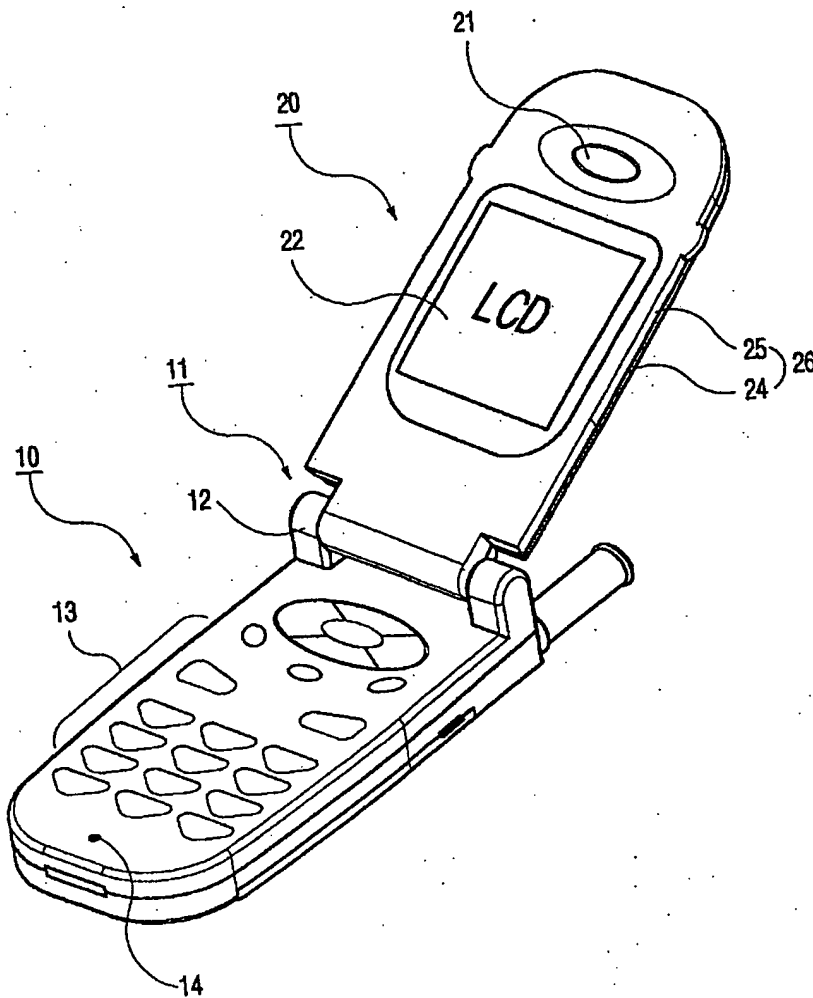
5. The device of claim 1, wherein the rigid member is formed in a grid shape.

6. In a liquid crystal display (LCD) protecting device of a mobile terminal a rigid member is attached on a case.

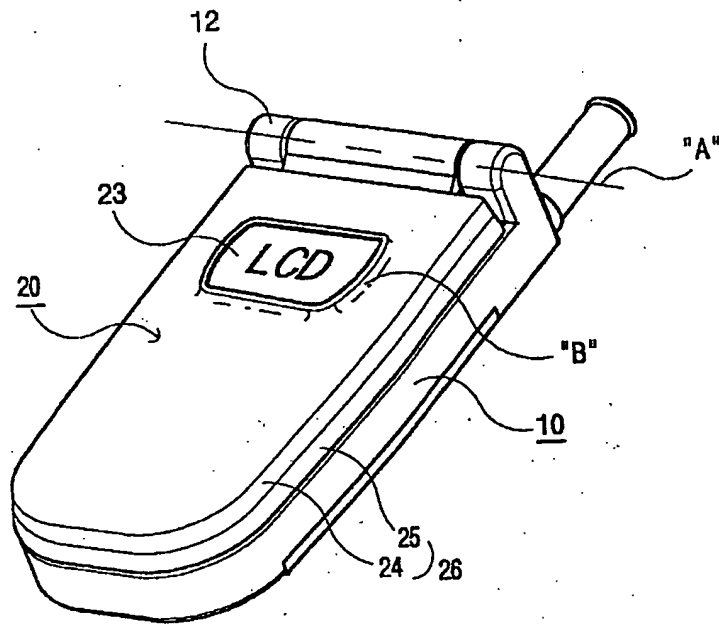


[DRAWING]

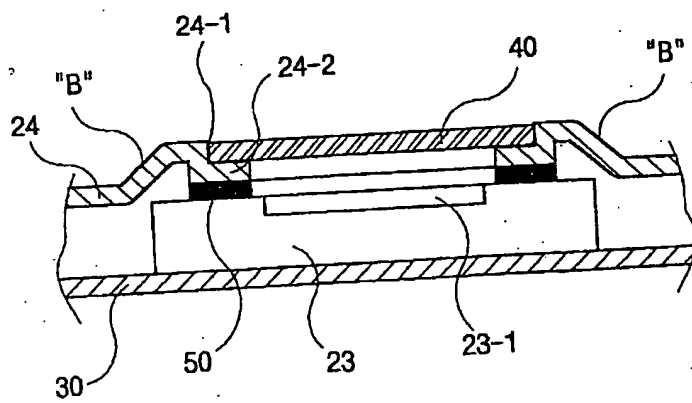
[FIG.1]



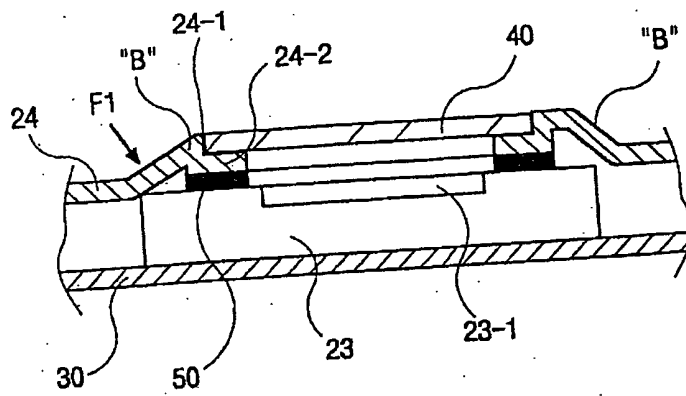
[FIG.2]



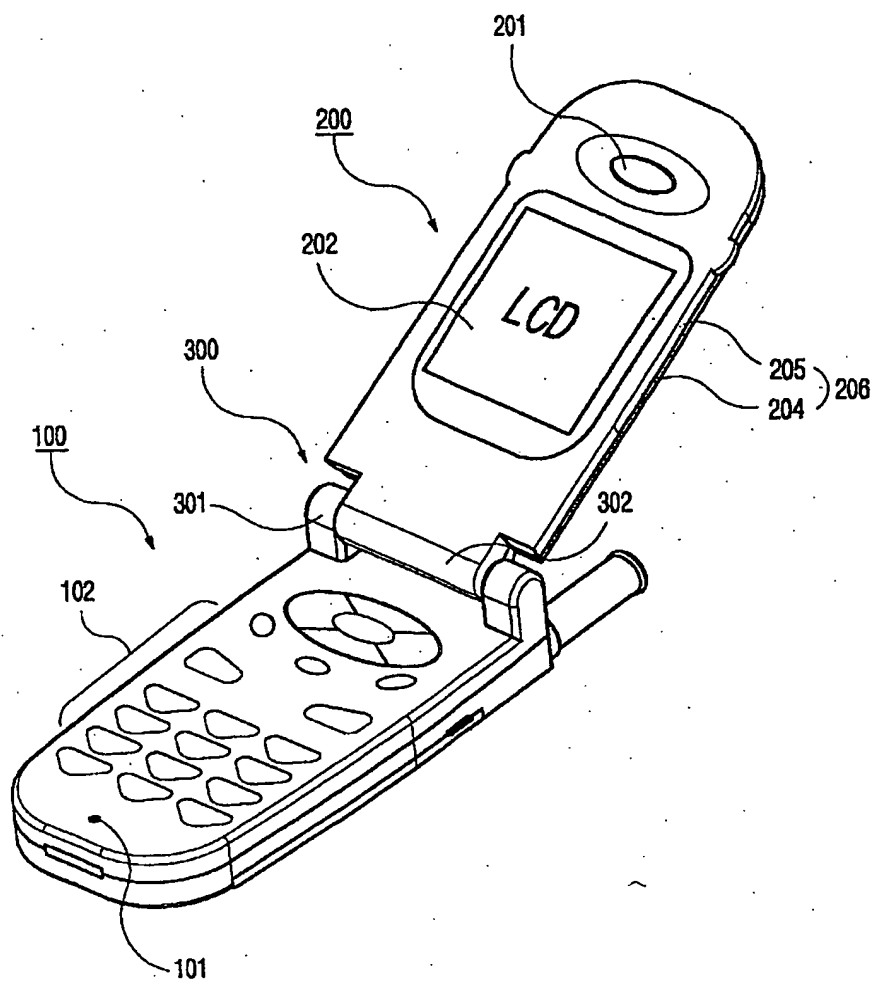
[FIG.3]



[FIG.4]

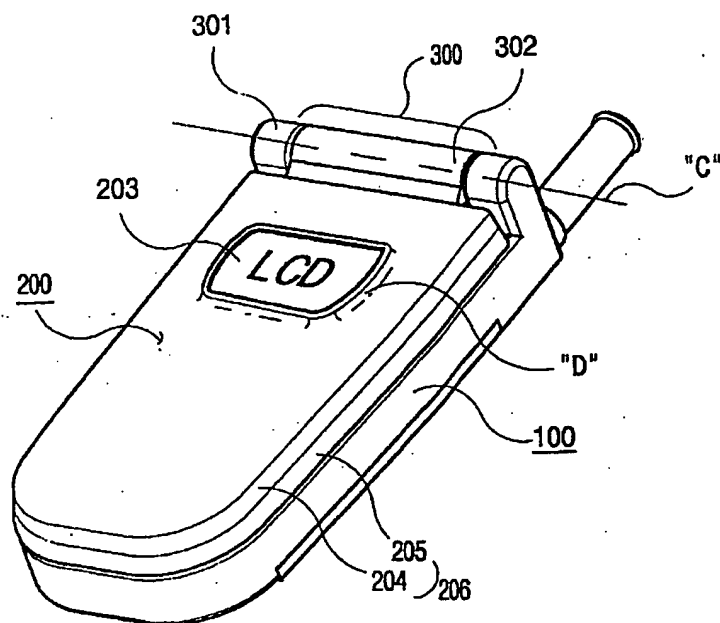


[FIG. 5]

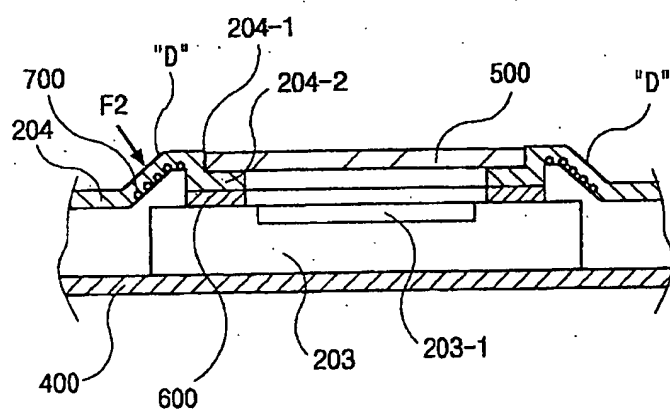




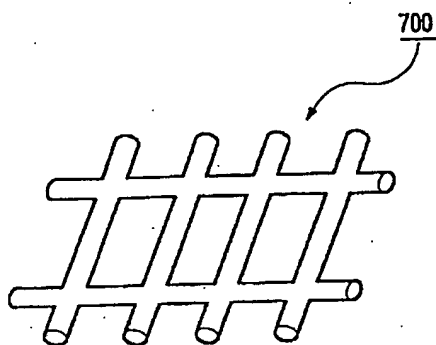
[FIG. 6]



[FIG. 7]



[FIG.8]



[FIG.9]

